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# WORK PLAN

## DOUGLAS-FIR TUSSOCK MOTH SUPPRESSION PROGRAM

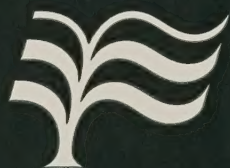


NORTHERN IDAHO

1986



United States  
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## INTRODUCTION

### **WORK PLAN**

### **DOUGLAS-FIR TUSSOCK MOTH SUPPRESSION PROGRAM FOR NORTHERN IDAHO, 1986**

By

**Lawrence E. Stipe**

**Kenneth E. Gibson**

**USDA Forest Service  
Cooperative Forestry and Pest Management  
Missoula, Montana**

**R. Ladd Livingston**

**Idaho Department of Lands  
Coeur d'Alene, Idaho**

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## INTRODUCTION

Douglas-fir tussock moth, Orgyia pseudotsugata McD. (DFTM) outbreaks in northern Idaho have occurred at near 10-year intervals for the past several decades. Past outbreaks have been recorded beginning in 1947, 1955, 1963, and 1972. The most recent outbreak subsided in 1975 following a DDT treatment in 1974. Current DFTM populations in northern Idaho are expanding and building rapidly. Douglas-fir tussock moth pheromone traps set throughout the Palouse area during 1985 recorded over a tenfold increase from 1984. Ground surveys in 1985 found scattered areas where larval populations were over 10 larvae per 1,000 square inches of foliage. New egg masses were common at many sites where none were found in 1984. The outlook for 1985 is for continued population increase and expansion. Visible defoliation should occur for the first time during the current outbreak cycle. Forest managers concerned over projected population buildup and stand damage formed an interagency group to examine possible management actions. Members represented the following groups:

### USDA Forest Service

- Clearwater National Forest
- Palouse Ranger District
- St. Maries Ranger District
- Cooperative Forestry and Pest Management

Bureau of Indian Affairs  
Coeur d'Alene Tribal Council  
Idaho Department of Lands  
Idaho Department of Parks and Recreation  
University of Idaho  
Industrial Forest owners  
Private Woodland owners.

Their recommendations were to continue the analysis process and to evaluate management alternatives in a format outlined by NEPA. An environmental assessment was prepared in which an aerial application of NPV was selected as the preferred alternative. It is proposed that high-risk and high-value stands in the outbreak area be treated with the Douglas-fir tussock virus. The administration of such a project will be a cooperative endeavor between the Forest Service and the Idaho Department of Lands. All land owners within the project area will have the opportunity to participate. This work plan describes the general procedures for the conduct of a Douglas-fir tussock moth suppression project. This plan includes information on project location and design administration and organization, sampling procedures, project budget, air operations, and safety. This project will be the first operational use of TM Biocontrol-1 since EPA acceptance and registration of this material in 1976.

## OBJECTIVES

The primary objective of the project is to minimize damage to high-risk and/or high-value stands through the introduction of a natural virus during an early stage of the current outbreak cycle. The basic procedure is to initiate a virus epizootic early in the cycle and cause the intensity and duration to be greatly reduced. This should preserve treated stands in a relatively undamaged condition. Reducing stand damage should contribute to the economic stability of the forest products industry and related activities in the area.

## PROJECT AREA

The project area extends along the Idaho/Washington border from Moscow north to Plummer and east to St. Maries and Boville, Idaho (figure 1). This area has been involved in all of the past several outbreaks and tends to be an area where defoliation first appears. A variety of ownerships are affected including USDA Forest Service (28 percent), Idaho Department of Lands (7 percent), University of Idaho (5 percent), Idaho Department of Parks and Recreation (2 percent), Coeur d'Alene Tribal Council (4 percent), small private holdings (16 percent) and large industrial (58 percent). Most of the rolling terrain at the lower elevations has been cleared for agricultural use. The higher and/or steeper terrain remains forested with a mixed conifer type. Stands contain mixed amounts of ponderosa pine, Douglas-fir, grand fir, subalpine fir, Engelmann spruce, western white pine, and minor amounts of lodgepole pine, western redcedar, and western larch. Good access is available as a result of past logging and mining activity. Annual precipitation averages nearly 25 inches--40 percent of which falls as snow. Only 9 percent falls as rain during the summer months. Logging is the primary land use on the forested lands while cattle grazing and dispersed recreation are important during the summer. Fishing activity is minimal since fish habitats are poor. No threatened or endangered plant or animal species are known in the area. Some developed recreational facilities--campgrounds, hiking or skiing trails, snowmobile routes, etc.--are in the area.

## ADMINISTRATION

Overall responsibility for administering the project will be shared by the Forest Service and the Idaho Department of Lands. Primary direction and coordination of the project will come through the Palouse Ranger District, Potlatch, Idaho, and the Bureau of Private Forestry, Idaho Department of Lands, Coeur d'Alene, Idaho. Technical support will be provided by the entomology group, Cooperative Forestry and Pest Management, Missoula, Montana. Administrative services will be provided by the Clearwater National Forest, Orofino, Idaho and the Northern Region, Missoula, Montana. The Palouse Ranger District office will serve as project headquarters prior to the operational phase of the project. A temporary field office will be set up to house project personnel.

## ORGANIZATION

Project management staffing for the project will come through temporary assignments in the Forest Service and State of Idaho. Sampling crews will be provided through seasonal employment. Aircraft application needs will be furnished through a full service contract (materials, storage, handling, mixing, and application). Duties and responsibilities for positions on the organization chart (figure 2) are outlined below.

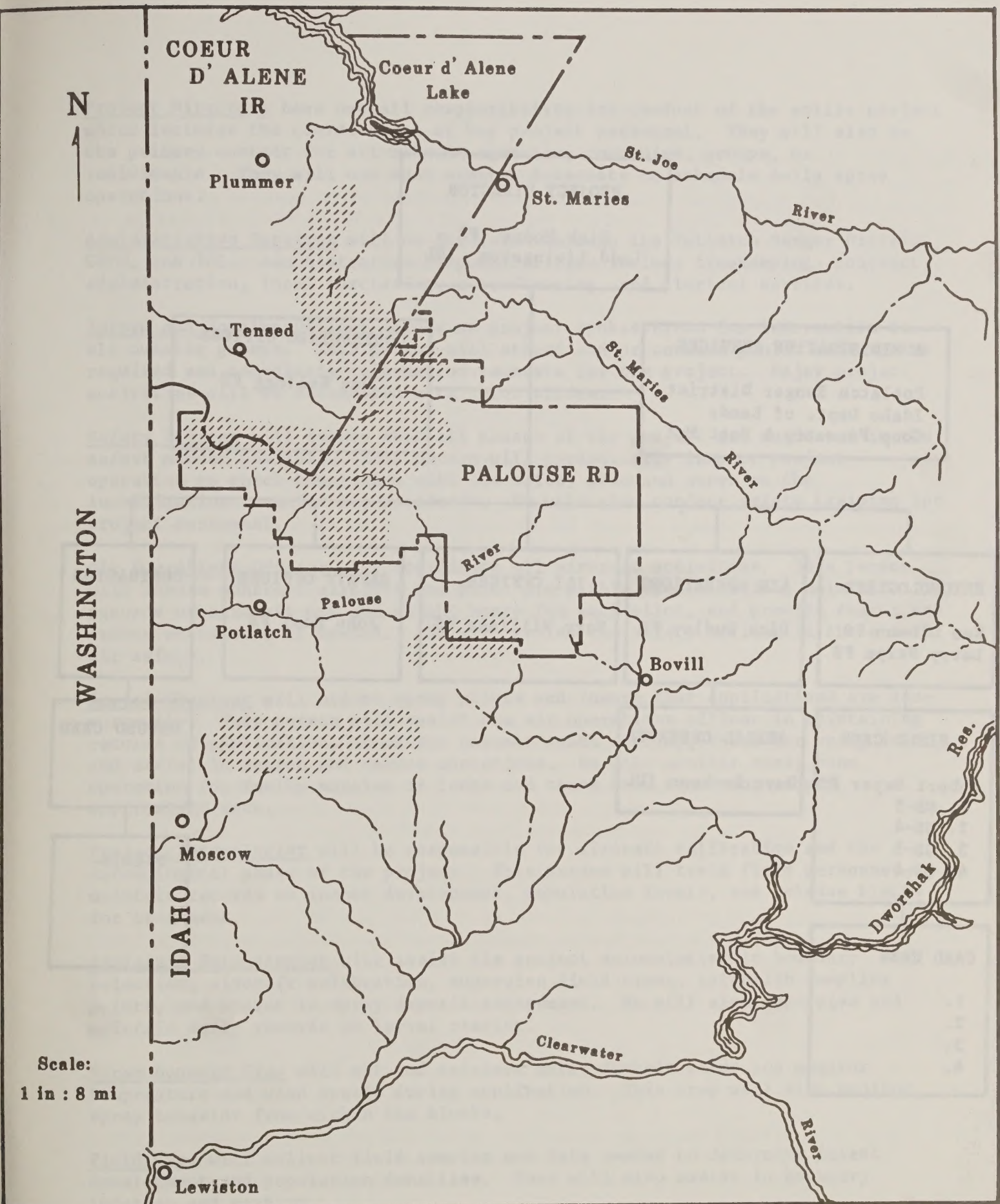
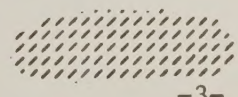


Figure 1



PROPOSED PROJECT AREA

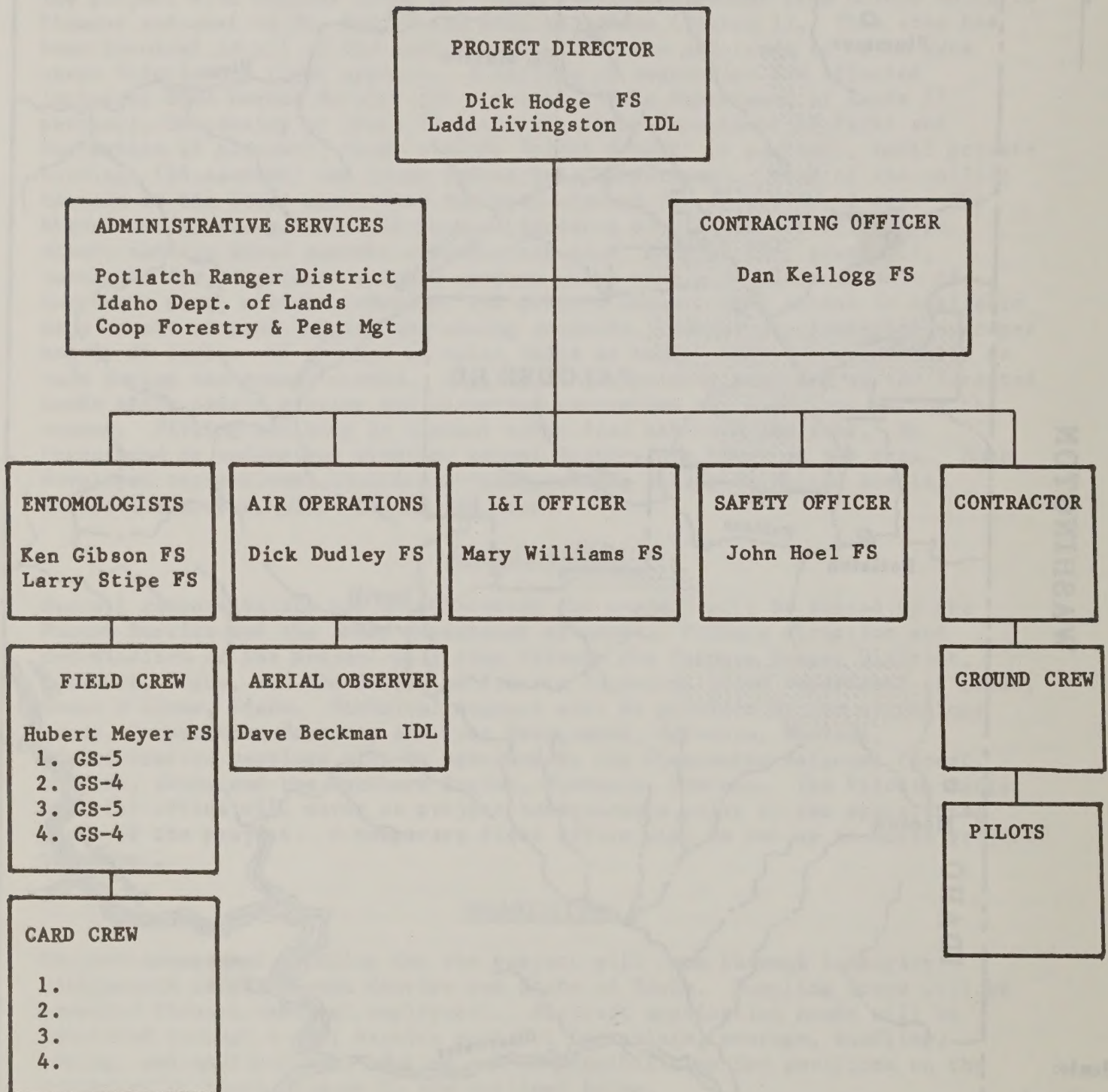


Figure 2.

Project Directors have overall responsibility for conduct of the entire project which includes the coordination of key project personnel. They will also be the primary contact for all outside agencies, companies, groups, or individuals. They will use spot weather forecasts to schedule daily spray operations.

Administrative Services will be furnished through the Potlatch Ranger District, CFPM, and IDL. Administrative responsibilities include timekeeping, contract administration, local purchasing, recordkeeping, and clerical services.

Inform and Involve Officer serves as project spokesperson for information to all outside groups. This person will attend and/or conduct public meetings as required and coordinate information requests for the project. Major project activities will be documented with color slides.

Safety Officer will insure that all phases of the project are conducted in the safest manner possible. This person will periodically inspect project operation to check compliance with the safety plan and serve on the investigation team for any accidents. He will also conduct safety training for project personnel.

Air Operations Officer will coordinate all aircraft activities. This person will insure contract aircraft and pilot are within specification, maintain records of aircraft use and flight hours for each pilot, and provide search and rescue assistance if needed. He will assist the safety officer in the area of air safety.

Aerial Observer will orient spray pilots and insure that applications are done correctly. This person will assist the air operations officer in maintaining records of application, check for correct swath overlap, check for spray drift, and assist in search and rescue operations. He will monitor spray boom operation for faulty nozzles or leaks and check boom times for proper application rate.

Project Entomologist will be responsible for aircraft calibration and the entomological phase of the project. This person will train field personnel, maintain records on insect development, population levels, and release blocks for treatment.

Assistant Entomologist will assist the project entomologist in boundary selection, aircraft calibration, supervise field crews, establish sampling points, and assist in spray deposit assessment. He will also supervise and maintain daily records on larval rearing.

Spray Deposit Crew will set and retrieve spray deposit cards and monitor temperature and wind speeds during application. This crew will also monitor spray behavior from within the blocks.

Field Crew will collect field samples and data needed to determine insect development and population densities. They will also assist in boundary location and marking.

## INFORM AND INVOLVE

The major function of the I&I effort for this project will be to insure that key individuals and the general public are informed about this project and understand its objectives. One of the most important items will be to inform the public about the safety of NPV. The I&I officer will serve as project spokesperson to all outside groups, and help identify our concerned public. The following techniques are available to accomplish our inform and involve goals.

News releases  
Fact sheets  
On-site tours

Broadcast media  
Meetings (group/open house)  
One-to-one contacts

## PROJECT FUNDING

Project funding will come from Forest Service suppression funds and the State of Idaho Forest pest control fund. There will be no Forest Service cost-share dollars as such available for this project. However, the Forest Service will contribute, without charge, enough TM Biocontrol-1 to treat State and private lands. The Forest Service will issue a full-service contract for materials, handling, mixing, and application. State funds for their portion of the contract will be handled through a formal collection agreement. Forest Service and State funding are outlined in the financial summary (figure 3).

## SAFETY

The goal of the project safety program will be no fatalities, no lost-time injuries, and a strong safety awareness by all personnel. The project directors will make final decision concerning safety and related matters. Their decision on unsafe practices or conditions brought to their attention will be final. Safety directives and policies for the project are found in FSM 6700, FSH 6709.11, Regional Safety and Health Plan, the Project Safety Plan (Appendix A), and Air Operations Safety Plan (Appendix B).

## PROJECT STRATEGY

The fundamental project strategy will be to initiate a DFTM virus epizootic early in the current outbreak cycle. Treatment blocks will be selected through a series of evaluation steps designed to eliminate any areas not within project guidelines. The following four steps will be used to identify treatment blocks. These will be currently infested areas with the highest risk and/or value.

1. Establish the overall DFTM outbreak area using 1985 pheromone trap information and cocoon and egg mass data from 1985.
2. Within the overall outbreak area, establish proposed treatment boundaries based on stand characteristics, terrain features, insect populations, and distribution of past outbreaks and suppression projects.

# FINANCIAL SUMMARY

|                       | PROJECT(FS)        | INDIRECT(FS)      | PROJECT(IDL)      | INDIRECT(IDL)     |
|-----------------------|--------------------|-------------------|-------------------|-------------------|
| <b>AIRCRAFT</b>       |                    |                   |                   |                   |
| Spray                 | \$36000.00         | \$0.00            | \$72000.00        | \$0.00            |
| Observation           | \$1860.00          |                   | \$3720.00         |                   |
| <b>SUBTOTAL</b>       | <b>\$37860.00</b>  | <b>\$0.00</b>     | <b>\$75720.00</b> | <b>\$0.00</b>     |
| <b>MATERIALS</b>      |                    |                   |                   |                   |
| Virus                 | ON HAND            | \$0.00            | \$0.00            | \$0.00            |
| Orzan                 | \$1050.00          |                   | \$2100.00         |                   |
| Molasses              | \$9000.00          |                   | \$18000.00        |                   |
| <b>SUBTOTAL</b>       | <b>\$10050.00</b>  | <b>\$0.00</b>     | <b>\$20100.00</b> | <b>\$0.00</b>     |
| <b>VEHICLES</b>       |                    |                   |                   |                   |
| Rental                | \$7500.00          | \$0.00            | \$0.00            | \$2500.00         |
| Gasoline & oil        | \$5760.00          |                   |                   |                   |
| <b>SUBTOTAL</b>       | <b>\$13260.00</b>  | <b>\$0.00</b>     | <b>\$0.00</b>     | <b>\$2500.00</b>  |
| <b>EQUIPMENT</b>      |                    |                   |                   |                   |
| Laboratory            | \$1500.00          | \$0.00            | \$0.00            |                   |
| Field                 | \$1500.00          | \$6800.00         |                   | \$300.00          |
| <b>SUBTOTAL</b>       | <b>\$3000.00</b>   | <b>\$6800.00</b>  | <b>\$0.00</b>     | <b>\$300.00</b>   |
| <b>ADMINISTRATION</b> |                    |                   |                   |                   |
| Temporary             | \$21320.00         | \$0.00            | \$0.00            | \$0.00            |
| PFT                   | \$2010.00          | \$8100.00         |                   | \$29500.00        |
| Per diem              | \$12000.00         | \$3000.00         |                   | \$5600.00         |
| <b>SUBTOTAL</b>       | <b>\$35330.00</b>  | <b>\$11100.00</b> | <b>\$0.00</b>     | <b>\$35100.00</b> |
| <b>SERVICES</b>       |                    |                   |                   |                   |
| Meteorology           | \$0.00             | \$0.00            | \$0.00            | \$0.00            |
| Maps & photos         | \$2000.00          |                   |                   |                   |
| Data analysis         | \$500.00           |                   |                   | \$500.00          |
| Tank samples          | \$200.00           |                   |                   |                   |
| Rearing media         | \$300.00           |                   |                   |                   |
| Soil samples          | \$500.00           |                   |                   |                   |
| <b>SUBTOTAL</b>       | <b>\$3500.00</b>   | <b>\$0.00</b>     | <b>\$0.00</b>     | <b>\$500.00</b>   |
| <b>OVERHEAD</b>       |                    |                   |                   |                   |
| District              | \$1125.00          | \$0.00            | \$0.00            | \$0.00            |
| Forest                | \$6480.00          |                   |                   | \$5573.00         |
| <b>SUBTOTAL</b>       | <b>\$7605.00</b>   | <b>\$0.00</b>     | <b>\$0.00</b>     | <b>\$5573.00</b>  |
| <b>PROJECT TOTAL</b>  |                    |                   |                   |                   |
| Forest Service        | \$110605.00        | \$17900.00        |                   |                   |
| State IDL             |                    |                   | \$95820.00        | \$43973.00        |
| <b>GRAND TOTAL</b>    | <b>\$268298.00</b> |                   |                   |                   |

Figure 3.

3. Based on the land management objectives and evaluation of risk and value, further adjustments will be made in block location and size.
4. The last opportunity for boundary alignment will come just prior to treatment. These adjustments will be based on pretreatment population.

### PROJECT DESIGN

Project design will consist of a series of independent spray blocks. Where possible, block boundaries will be placed along prominent terrain features for easy identification. To minimize variation in application, all of any given block must be sprayed during the same day. Population development, sampling, treatment, and project effectiveness will be determined by block.

Nontreated blocks (control blocks) are not usually an integral part of an operation project design. However, the University of Idaho has chosen not to treat its experimental forest lands near Moscow Mountain. These untreated stands will provide an opportunity to set aside several control blocks to better evaluate project effectiveness.

### INSECTICIDE

The selected pesticide for this project is a formulation of a natural occurring virus of the Douglas-fir tussock moth. It was produced by the USDA Forest Service in Corvallis, Oregon and is registered by the EPA under the name TM Biocontrol-1 (figures 4A and 4B). This formulation is approved for aerial application at one-half ounce per acre ( $1.085 \times 10^6$  AU) in a gallon of mix per acre. The tank mix formula is one-half ounce virus, three-fourths gallon water (chlorine free), one-fourth gallon molasses, and one-half pound sunscreen (Orzan LS). The active ingredient consists of polyhedral inclusion bodies of the Douglas-fir tussock moth nucleopolyhedrosis virus. Fat bodies ultimately become infected and rupture, thus killing the insect. TM Biocontrol-1 has no contact action. This virus is highly infectious to all species of Orgyia. However, adverse effects on nontarget organisms are undocumented.

### PESTICIDE STORAGE AND DISPOSAL

Pesticides will be stored at the project headquarters as outlined in FSM 2157.2. The following will receive special attention:

1. Store pesticides in a locked, dry storage shed where unauthorized personnel cannot come in contact with it. Storage of TM Biocontrol-1 above 80°F may impair activity of this product.
2. Plainly label each entrance to the pesticide storage area with prominent waterproof signs bearing the words "Pesticide Storage."
3. Store pesticides in original, labeled containers, make sure each label is both visible and legible.

## **DIRECTIONS FOR USE GENERAL CLASSIFICATION**

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

For population reduction of the Douglas-fir tussock moth, apply by air at the rate of ½ ounce (14.2 grams) TM Biocontrol-1 in 1 to 2 gallons finished spray per acre. Stickers and u.v. protectants may enhance performance of this product. Refer to technical bulletin for mixing and application instructions. Spray tank mixture pH should be 6.0 to 7.2 **NEVER USE CHLORINATED WATER IN THE SPRAY FORMULATION.**

## **PRECAUTIONARY STATEMENTS CAUTION ENVIRONMENTAL HAZARDS**

Avoid application to lakes, streams, or ponds. Do not contaminate water by cleaning of equipment or disposal of wastes.

## **STORAGE AND DISPOSAL**

Activity may be impaired by storage above 80°F.

Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container.

Pesticide, spray mixture, or rinsate that cannot be used should be disposed of in a landfill approved for pesticides or buried in a safe place away from water.

Container disposal: Triple rinse and dispose of in an approved landfill or bury in a safe place.

Consult Federal, State, or local disposal authorities for approved alternative procedures.

## **TM BIOCONTROL-1 BIOLOGICAL INSECTICIDE FOR THE DOUGLAS-FIR TUSSOCK MOTH**

### **Active Ingredient:\***

|   |       |
|---|-------|
| Polyhedral inclusion bodies of Douglas-fir tussock moth nucleopolyhedrosis virus) | 3.5%  |
| Inert ingredients:  | 96.5% |

**TOTAL** ..... 100.0%

\*Contains at least 70 million activity units per gram.

## **KEEP OUT OF THE REACH OF CHILDREN CAUTION**

See back of tag for additional precautionary statements.

For use by or under the supervision of the U.S. Forest Service.

**NOTICE:** The U.S. Forest Service makes no warranty, express or implied including the warranties or merchantability and/or fitness for any particular purpose, concerning this material except those which are contained on the U.S. Forest Service's label.

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14th and Independence Avenues  
Washington, D.C. 20250

**EPA REG. NO. 27586-1**

**NET WEIGHT:** \_\_\_\_\_ **LOT NO.:** \_\_\_\_\_

Figure 4A

IDAHO DEPARTMENT OF AGRICULTURE  
DIVISION OF PLANT INDUSTRIES  
BUREAU OF PESTICIDES  
P.O. BOX 790  
BOISE, IDAHO 83701

USDA FOREST SERVICE  
P.O. BOX 2417  
WASHINGTON, DC 20013

ATTN: DENNIS R. HAMEL

\* \* \* \* \*

1986 CERTIFICATE OF REGISTRATION OF PESTICIDES

\* \* \* \* \*

CERTIFICATE NUMBER: 2318 CERTIFICATE DATE: 02/10/1986

DIRECTOR OF AGRICULTURE

RICHARD R. RUSH

UNDER AUTHORITY OF THE DIRECTOR OF THE IDAHO STATE DEPARTMENT OF AGRICULTURE,  
THIS CERTIFIES THAT THE PESTICIDE(S) LISTED ON THE ATTACHED PRODUCT  
REGISTRATION FORM AND/OR COMPUTER PRINT-OUT HAVE BEEN DULY REGISTERED FOR THE  
CURRENT YEAR FEBRUARY 6, 1986 THROUGH DECEMBER 31 OF THE SAME YEAR.

QUESTIONS CONCERNING THIS LISTING SHOULD BE SENT TO:

IDAHO DEPARTMENT OF AGRICULTURE  
BUREAU OF PESTICIDES  
P.O. BOX 790  
BOISE, IDAHO 83701  
TELEPHONE: 208-334-3243

STATE OF IDAHO  
1986 PESTICIDES CERTIFIED FOR SALE IN IDAHO

REGISTRANT EPA NUMBER: 27586 REGISTRANT RECORD NUMBER: 890  
CERTIFICATE NUMBER: 2318 CERTIFICATE DATE: 02/10/1986

| EPA<br>NUMBER | PRODUCT NAME            | PRODUCT<br>NUMBER |
|---------------|-------------------------|-------------------|
| 27586 840005  | METHYL CYCLOHEXEN 1-ONE | 8345              |
| 27586 1       | TM BIOCONTROL-1         | 8346              |

TOTAL PRODUCTS CERTIFIED : 2  
TOTAL AMOUNT OF FEES :\$ 0.00  
TOTAL AMOUNT OF LATE FEES:\$ 0.00  
TOTAL AMOUNT OF CHARGES :\$ 0.00

4. Store empty pesticide containers as though they were full until such time as proper disposal can be arranged.
5. Never store pesticides near food or animal feed.

The local fire department will be notified of the storage area, its contents, and any special hazards should there be a fire. Disposal of unused pesticides and pesticide containers will follow the procedures and guidelines in FSM 2157.3. Unopened pesticide containers will be returned to the Forest Service stock pile in Corvallis, Oregon. Project director will designate an approved landfill for disposal of all project waste materials.

#### CONTRACTING

The Forest Service will issue a full-service aerial application contract for this treatment. The contractor will provide all materials, equipment, and services except the pesticide and a water source. Contractor responsibilities will include the following:

1. Purchase molasses
2. Purchase sunscreen (Orzan LS) or (orzan LS50)
3. Provide local material storage (all but the virus)
4. Transportation of materials and equipment to airstrip (including water)
5. Provide personnel and equipment necessary to mix and load aircraft
6. Provide pilot and aircraft to apply 1 gallon of spray mix per acre as outlined under Air Operations section of this plan.

#### APPLICATION TIMING

Based on virus mode of action in DFTM biology, the primary spray target will be newly expanded grand fir or Douglas-fir foliage. The optimal time would occur when newly emerged larvae have dispersed from the egg mass to their feeding sites on the new foliage. Stage IV as described in Agriculture Handbook No. 532 will be used to release blocks for treatment. The following conditions will be met before block release:

1. At least 90 percent of expanding shoots over 1 inch long
2. At least 50 percent of larvae are in the second instar.

These conditions should occur sometime near June 15.

#### SAMPLING PROCEDURES

These procedures are designed to gather the necessary information to properly time the application and evaluate project effectiveness. Most samples will be taken from trees located at permanent plot sites. These sites will be selected

to best represent stand conditions, elevation, aspect, etc. found in the block. Sample trees will be grand fir and Douglas-fir 30-60 feet tall. Trees are best when open grown with full crowns.

Foliage Development. Five to 10 sample plots will be established in each block. One hundred new shoots on four branches of one tree will be rated for shoot elongation. Shoots will be rates as less than or greater than 1 inch. These plots will be visited at least twice a week.

Larval Development. Using the lower crown beating technique, young larvae will be collected to estimate larval instar development. One tree from each of the foliage development sites will be visited two or three times a week to determine development.

Prespray Larval Population. Douglas-fir tussock moth larval population density estimates for each block will be made at the same plot locations used for development. No attempt will be made to use the same trees. Three midcrown branch tips will be cut and larvae will be counted. See Agr. Handbook #547 for type of sampling equipment and detailed procedures. This sample will be taken within 48 hours of treatment.

Postspray Larval Population. The postspray larval population estimate will start when 50 percent of the larvae are in the fifth instar. The same branch cutting technique described in Agr. Handbook #547 to estimate prespray density will be used. Plot locations and sample trees will be the same as those used for the prespray samples. Larvae collected during this sample will be counted and then placed on an artificial diet and reared to maturity. A virus diagnosis will be made on those that do not emerge as adult moths.

Pheromone Trapping. Pheromone traps will be set to monitor moth flight following treatment. Traps will be placed at all the population monitoring locations. Additional trap sites will be selected near the treatment blocks to bring the total trap sites to 200. Five baited traps will be hung at each site. See Agr. Handbooks #517 and #546 for detailed trapping instructions and moth identification.

Cocoon and Egg Mass Sampling. A cocoon and egg mass survey will be conducted at the population monitoring locations used for the prespray and postspray samples. At each site, two people will each spend 15 minutes searching for cocoon and egg masses among the lower crown branches. The number of trees examined at each site will depend on foliage and tree conditions.

Soil Samples. Soil samples will be collected from each population-monitoring location. An approximately 1-pound sample will be taken at the drip line of one dominant tree per location. These samples will be collected during the prespray sample and again during the cocoon and egg mass survey. Samples will be sent to Corvallis, Oregon to determine the amount of virus.

#### AIR OPERATIONS

The spray mix will be applied by agricultural spray aircraft of a type generally used for forest spraying. An observation aircraft will be used to map progress, orient spray pilots, and provide aid to air guidance as needed

for proper application. A local airstrip will be used as a base of operations. It will be located as near the spray blocks as possible. Several aircraft will be needed to meet the daily production capacity of 5,000 to 6,000 acres during a 3- to 4-hour spray window. Treatment will commence at daybreak and will continue until stopped by weather conditions (see Meteorology section).

The project director will identify any areas of open water or large streams which are to be avoided. These areas will be designated as no treatment and marked on air photos for pilot orientation.

The applications contractor will provide the personnel, materials and equipment necessary for storage, mixing, handling, loading, and spraying. This will include everything except the virus and the water source. The air contractor will provide for aircraft inspection, calibration, and characterization prior to the project.

#### COMMUNICATIONS

A two-way FM radio network will be established for the project. Mobile radio pack sets will be used by field crews for ground-to-ground communications. The Forest Service air net frequency will be used for ground-to-air communications between the operations base and the spray aircraft. Air-to-air will utilize normal aircraft frequencies.

#### METEOROLOGY

Two types of weather information will be needed: (1) short-term weather forecasts with specific information of chance and amount of rain, and (2) current temperature and wind conditions during application. Arrangements will be made with NOAA to provide spot forecasts from their nearest office. Forecasts are needed each evening prior to the next day's treatment. Dry foliage before treatment and at least 4 hours drying time after treatment are needed for proper application. During application weather observers will be stationed in the spray blocks to monitor current conditions. At least every 30 minutes or as conditions change, temperature and windspeed will be monitored and relayed via two-way radio to the project director. Spray operations will be discontinued when temperatures reach 68°F and/or windspeed exceeds 8 MPH. The project director will monitor weather conditions and stop application if conditions are not suitable.

#### TANK SAMPLES

Tank mix samples will be taken from at least one batch per spray block. Additional samples may be needed to verify mixing problems.

#### SPRAY DEPOSIT ASSESSMENT

White kromkote cards will be used to monitor distribution and amount of spray deposit in each block. No dye will be needed since the molasses and Orzan provide sufficient color for easy detection on white cards. Cards in plastic holders (sampler) will be located in stand openings near the population-

monitoring sites. Bridge spikes will be used to hold the sampler approximately 6 inches above the ground. Twenty samplers will be placed in a line at a 10-foot spacing. When possible, sampler line should be perpendicular to the slope and or swath pattern. At least one card line will be placed in each block. If deposit shows retreatment is necessary for proper coverage, provisions in the application contract will be followed.

#### SECOND-YEAR EVALUATION

Surveys are planned in 1987 to evaluate treatment effects on young and mature larvae, defoliation, virus level in soil, moth flight, and egg mass densities. These surveys will use the same sampling procedures described in this plan. Timing of the early larval sample will be the same as the treatment year prespray. A detailed sampling plan will be prepared for the 1987 followup work.

#### REPORTING

Upon completion of this project, results and impacts will be monitored and compared with nonsprayed areas. These results will be presented in a formal report including recommendations for control of future Douglas-fir tussock moth outbreaks. Second-year results will be reported in a followup report.

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## APPENDIX A

### DOUGLAS-FIR TUSSOCK MOTH SUPPRESSION PROJECT

#### SAFETY PLAN 1986

#### PREFACE

A suppression project to reduce DFTM populations through an aerial application of DFTM virus will be conducted in 1986. The project will be carried out in mixed conifer stands on USDA Forest Service, State of Idaho, and private lands in northern Idaho. Success of the insecticidal applications will be determined by resultant larval mortality in treated blocks when compared to natural larval mortality in untreated check blocks. Aerial applications will be made using fixed-wing aircraft. Ground crews will support the aerial portion of the project. The Project Work Plan details procedures, policy, objectives, and personal responsibilities attendant to the project. This document, as a supplement to the work plan, further outlines each individual's responsibility for the safe conduct of the project.

#### GOALS

The safety goals of this project are the prevention of accidents and the protection of each person involved. To meet these goals, the following objectives must be met.

1. Each person involved in the project, regardless of the nature of that involvement, must strictly adhere to safety practices outlined here and in other supporting documents.
2. No fatalities and no lost-time injuries.
3. Prevention of accidents, both on and off the job.
4. Management must accept responsibility for the safe operation of the project. Further, each employee must accept responsibility for his/her own safe conduct.

#### RESPONSIBILITIES

The Project Director is directly responsible for the project's safety program which includes the directives outlined in this plan as well as governing articles found in FSM 6700, FSH 6709.11 (Health and Safety Code Handbook) and FPM Unit Safety Plan. In addition, he will insure that all personnel are provided nonhazardous working conditions; proper training to do their job safely; safe, defective-free equipment, adequate first aid training and supplies; and adequate time to do their job safely. The Project Director will also be responsible for supervising the use of the pesticide (TM BioControl-1), including its transportation, mixing, storage, and disposal.

The Project Safety Officer is responsible for the implementation of the Project Safety Plan. He will assure that policy and practices of safety are adhered to by every individual engaged in any facet of the project.

## GENERAL SAFETY PLAN

### Prevention

The following preventive measures will be followed during the project to reduce the probability of an accident or lessen its severity should one occur.

1. The general public will be made aware of application schedules. While no human health risks from the virus exist, safety precautions will dictate that travel into treatment areas will be discouraged on the day of application.
2. No spectators will be allowed in the loading area.
3. Smoking will not be permitted within 50 feet of any fueling or loading operations.
4. All field crew members will be provided safety and first aid training prior to the project. This training will include specific hazards recognition and instruction concerning safeguards necessary while working around spray materials, equipment, and vehicles.
5. Loading and fueling area for fixed-wing aircraft and helicopters will have a vehicle equipped with a two-way radio, first aid kit, fire extinguisher, stretcher, and fire tools. This vehicle will also serve as an ambulance should the need arise.
6. The nearest hospital will be notified concerning the nature of the project and the type of pesticide being used.
7. Emergency telephone numbers will be posted in all work areas.
8. Preventive measures identified in other parts of the plan will also be adhered to.

### Ground Vehicles

The operator of any vehicle has primary responsibility for the safe maintenance and operation of that vehicle. All vehicle operators must have a valid State operator's license and must be familiar with FSH 7109.18 (Driver-Operator Handbook). They will observe all State, local, and Forest Service driving regulations.

The operator and all passengers will travel with safety belts fastened at all times. No vehicle will carry more passengers than the number of safety belts provided for them.

Both the Driver-Operator Handbook and the Health and Safety Code Handbook provide suggestions for safe vehicle operation. Each driver must; however, recognize his responsibility to:

1. Consider the differences between highway driving conditions and those existing on most forest roads. Roads are often narrow, winding, unpaved, and steep. Sight distances are lessened by curves, dust, etc., and the driver's ability to see and be seen is often greatly reduced.
2. Drive defensively. The best defense against vehicle accidents is learning to recognize hazards and ways to avoid them. On forest roads, defensive driving is particularly important. Drive with headlights on, drive more slowly, keep to the right, and expect another vehicle at each blind curve. Anticipate that all other vehicle operators will do something wrong.

At the beginning of each day, the vehicle operator should check for proper functioning of the mechanical systems of his vehicle; check condition of tires and wheels; maintain adequate fuel, oil, and fluid levels. Report needed repairs or equipment to the Field Crew Leader.

### Air Operations

This suppression project will entail the use of aircraft--both fixed-wing and helicopters. Most phases of the project having to do with aircraft and air operations will be conducted by personnel under Government contract; however, Federal and State employees will become involved with these operations on occasion. All personnel so involved must be aware of particular hazards and be prepared to exercise necessary caution.

Though these operations must be viewed as hazardous by their very nature, most accidents involving aircraft are the result of human error. Most such accidents are preventable. By practicing safety, serious accidents will be avoided. Personnel working in and around aircraft will comply with the following:

1. Stay away from aircraft when engines are in operation unless authorized by the pilot.
2. When nearer than 50 feet to the aircraft, approach or leave from an angle so that the pilot can always see you.
3. Unless wearing safety goggles or glasses, do not watch landings, takeoffs, or hovering closer than 100 feet to helicopter.
4. When aboard aircraft wear seat belts, hard hats (or crash helmet), and flame-resistant (Nomex) clothing.
5. When a passenger, do not approach or leave aircraft until instructed to do so by the pilot.
6. When approaching or leaving aircraft, be especially mindful of rotors or propellers. Special care must be exercised around helicopters because of the danger of the tail rotor.

7. The pilot has final say concerning the safe operation of his aircraft. Marginally safe altitudes, flight speeds, or landing areas will be avoided at his discretion.

#### Mixing, Loading, and Spills

The insecticide being used in this project, TM BioControl-1, is a host-specific agent which has never exhibited adverse effects on nonhost organisms. Therefore, the hazards normally encountered when chemical insecticides are used or handled do not exist in this case. Still, precautions should be taken to avoid unnecessary spillage of insecticide mixtures. Likewise, caution should be exercised during mixing and loading of insecticide and other materials and in the fueling of aircraft.

Though innocuous to humans, caution is advised in handling the pesticide. Contact with skin, eyes, or clothing should be avoided. Handling, storage, and disposal instructions appearing on product label will be strictly adhered to.

#### TECHNICAL DATA

|                         |   |
|-------------------------|---|
| Insecticide             | TM BioControl-1   |
| EPA registration number | 27586-1   |
| Active ingredient       | Polyhedral inclusion<br>bodies of Douglas-fir<br>tussock moth virus                 |
| Manufacturers           | USDA Forest Service,<br>Corvallis, Oregon   |
| Formulation             | Powder  |
| Cautions                | Keep out of reach of<br>children. Avoid<br>contact with skin,<br>eyes, or clothing. |
| Antidote                | Not applicable  |

#### EMERGENCY ASSISTANCE

Dial 9-1-1

Poison Control Center: Spokane, Washington  
509-747-1077 or 1-800-541-5624

Hospitals: Gritman Memorial  
Moscow, Idaho  
208-882-4511  
  
Benewah Community  
St. Maries, Idaho  
208-245-5551

County Sheriff: Latah County  
Moscow, Idaho  
208-882-2216

Benewah County  
St. Maries, Idaho  
208-245-2555

Local Police Dept.: Moscow, Idaho  
208-882-5551

Ambulance: 208-882-2422

Fire Dept.: Moscow, Idaho  
208-882-2422

St. Maries, Idaho  
208-245-3344

Palouse Ranger District: Potlatch, Idaho  
208-875-1131

St. Maries Ranger District: St. Maries, Idaho  
208-245-2531

National Response Center: 1-800-424-8802  
(Environment)

#### ACCIDENT REPORTING

All accidents and serious injuries will be reported to the Project Safety Officer. Accidents involving aircraft will be reported immediately to the Regional Air Officer. Where required, necessary accident and injury reports will be made in accordance with FSH 6709.11, FSH 7109.18, and FSM 67330.

## APPENDIX B

### AERIAL APPLICATION OF CHEMICALS

The following safety rules and procedures have been extracted from FSH 6109.13 "U.S. Department of Agriculture, Forest Service Health and Safety Code," FSM 2140 "Forest Insect and Disease Suppression," FSH 5700 "Air Operations," and other sources.

This plan incorporates general guidelines for developing, equipping, and manning airports for supporting aircraft operations.

This plan does not itemize all the safety rules which are applicable to aircraft operations. Project personnel should be constantly alert to detect any unsafe practices and correct them immediately.

All project personnel should be familiar with this plan and a copy of this Safety Plan should be in the possession of each person who is a COR, Inspector, Base Station Operator, or Project Officer on a project on which aircraft are used.

Doctors and ambulance services, which will be available in case of emergency, and an Accident Reporting Chart are listed in Section XI.

#### Section:

- I: Guidelines for Developing Base Airports for Spraying
- II: Personnel Working on any Aircraft Project
- III: Personnel Working on Aircraft Spray Projects
- IV: Visitors to the Aircraft Project
- V: Aircraft
- VI: Pilot Safety
- VII: First Aid and Accident/Incident Reporting
- VIII: Search and Rescue Before Crash is Located
- IX: When Crash is Located
- X: When Crash Site is Reached
- XI: Where to Obtain Medical Treatment

## Section I

### Guidelines for Developing Base Airports for Spray Projects

#### A. Physical Considerations

1. The airport should be situated so that the approach and departure routes are into the prevailing wind.
2. The airport should be dustproofed with either dust abatement chemicals or water, as needed.
3. Approach and departure routes should not exceed 8:1 slope and the side clearances should not exceed 2:1 slope.
4. A wind sock will be erected in an open area away from the flight routes.

#### B. Personnel Considerations

Technical (Maintenance) Inspector and Forest Service Pilot Inspector (may be one person, if qualified) will be used on all projects. The Technical Inspector and Forest Service Pilot may be needed only at the start of the project.

Air/Spray Operations Officer - Overall supervision and safety of aircraft operation marshaller: radio and traffic routing.

Loader and Assistant - Proper loading and manifesting of chemicals, manifesting and loading.

#### C. Equipment Considerations

1. Forest net, air net, or VHF radio.
2. Wind sock and pole.
3. One 120-lb. fire extinguisher per two aircrafts.
4. Dust abatement materials (if necessary).
5. Personal protection equipment for each person working around aircraft.
  - a. Goggles.
  - b. Hard hat with chin strap.
  - c. Flame-resistant clothing.
  - d. High visibility vest for marshallers.
  - e. First aid kit.
  - f. Hazard maps.

## Section II

The designated COR Inspector, Project Officer, or Air Service Manager will enforce the safety rules outlined in Sections II through X.

### Personnel Working on Spray Project Shall:

- A. Become familiar with and comply with FSH 6109.13, Forest Service Health and Safety Code.
- B. Wear nonskid-soled footwear with snag-resistant shirts and trousers.
- C. Stay away from aircraft when propeller blades are in motion. This means stay at least 50 feet away from fixed-wing aircraft.
- D. When closer than 50 feet to aircraft, approach to leave from front of aircraft, where pilot can always see you.
- E. Never approach or leave aircraft from any side where ground is higher than ground where aircraft is standing.
- F. Unless equipped with safety goggles or glasses, do not watch landings, takeoffs, or hovering closer than 100 feet from aircraft.
- G. When aboard aircraft, wear seat belts, hard hats, or crash helmets with chin strap, shoulder harness, and flame-resistant clothing. Keep safety belt fastened until instructed by pilot after landing to leave the aircraft.
- H. Stay away from propeller at all times and see that others do likewise.
- I. When working in the vicinity of aircraft, wear headgear that will not blow off and foul helicopter or other equipment.
- J. Keep landing area clear of debris and equipment which may be dislodged by the wind created by the propeller blade.
- K. Report overdue aircraft, malfunctioning equipment or aircraft to the COR or Project Officer immediately.
- L. When a passenger, do not approach or leave the aircraft until authorized by the pilot.
- M. Keep the base station informed as to the location of the aircraft.
- N. Observe no smoking as follows:
  - 1. Smoking in or around aircraft is prohibited.
  - 2. Passengers and crew will not carry "strike anywhere" matches on aircraft flights.

### Section III

#### Personnel Working on Spray Project Shall

- A. Persons working with spray material should wear clean work clothing daily.
- B. Keep children and irresponsible adults, pets, and livestock out of loading or storage sites and areas in which application is in process.
- C. Wash hands with soap and water immediately after contact with dye and fuel oil, and before smoking or handling food. Do not eat, drink, or smoke while near dye and/or fuel oil.
- D. Select sites for loading and cleaning of equipment and storage to avoid contaminating streams, ponds, cisterns, food stocks, or crops adjacent to work area.
- E. Pick up and safely dispose of empty chemical containers immediately after use. (FSH 6109.13, Sec. 8.37).
- F. Never use milk or beverage bottles or other types of food containers for storage of chemicals.
- G. Clean up spilled chemicals at once.
- H. Label all containers which are used for chemical storage.
- I. Do not allow leaks in the spray distribution system or in the chemical mixing equipment.
- J. Arrange spraying schedules so that poor visibility before and shortly after sunrise and sunset will not affect the safety of the pilot.
- K. Allow spraying from a higher altitude where steep canyonheads, snags, or standing timber in the spray area make it too hazardous to spray at the specified contract heights.
- L. Allow sufficient elevation to be gained by the pilot at the lower open end of drainages after a spraying run to eliminate the need to climb in returning for another spray run.
- M. Pilot will cease spraying when, in his own judgement, conditions are too hazardous.
- N. Handle full barrels of chemicals or diesel oil with care to avoid personal injury. Use barrel rolls when applicable.
- O. Maintain maximum flight height over vegetative cover and obstacles which permit acceptable results, as specified in contract being administered--usually 50 feet above canopy.
- P. Pilot will conduct reconnaissance flights prior to spray day.

## Section IV

### Visitors

- A. Will be kept in safe areas by all project personnel.
- B. Will be told to leave the project area if they refuse to comply with applicable safety rules as outlined in Section II of this Safety Plan.

## Section V

### Aircraft

- A. Monitor preflight inspections to be performed by pilot each day, including oil and gas check. Visual check without disassembly of aircraft for items such as oil leaks, loose nuts or bolts, worn hinges, and bad tires or skids.
- B. Check reserve fuel supply.
- C. COR will issue Suspend Work Order for aircraft which is considered unsafe or otherwise unsatisfactory for performance of ferry, reconnaissance, or application flights.
- D. Do not permit the aircraft to be refueled while the engine is running or propeller blades are turning.
- E. Insure that a suitable electrical ground is provided when aircraft is being refueled with metal container.

## Section VI

### Pilot Safety

- A. Flight plans will be filed for all flights.
- B. Ridges are to be approached at not more than a 45-degree angle.
- C. Caution pilots to recognize dangers, such as long snags and trees and probable locations of downdrafts. Review District hazard map with each pilot, to include areas to be sprayed and approaches to and from those areas.
- D. Caution pilots so to the location of known telephone or power lines near any airport which will be used and in the vicinity of spray area.
- D. Pilots will wear flight helmets and flame-resistant clothing as specified in the contract.
- F. Pilots will not fly in fog, heavy rain, or before daylight or after dark.

G. Pilots will not exceed the flight and duty time limitations as outlined below:

1. Flight time will not exceed a total of 7 hours per day.
2. Pilots accumulating 30 or more hours of flying in any 6 consecutive days will be off duty the following full calendar day.
3. Pilots must have a minimum of 10 consecutive hours off duty within 24 hours after the beginning of any duty.
4. Duty includes flight time, ground duty of any kind, and standby or alert status at any location.
5. During any 14 consecutive days, pilots will be off duty for 2 full calendar days. Days off duty need not be consecutive.
6. A duty day is any day a flight is made or 4 hours or more of other duty is performed.

NOTE: Regional Aviation Officers, or their equivalent, may waive the "consecutive" part of Item 3 so that pilots flying such missions as aerial application may have two shorter off-duty periods provided they aggregate 10 hours or more.

- H. The sending District will notify the receiving District of the daily accumulated flying time for each pilot in any 6-day period when between Districts moves are made.
- I. The pilot in command will be responsible for the safety of the aircraft, its occupants, and cargo. He has complete authority to postpone, change, or cancel any flight when he believes existing or impending conditions make it unsafe.
- J. Always recognize and guard against the effects of pressure altitude as affected by temperature.
- K. Do not dispatch aircraft for mountain flying when average wind velocity over a 5-minute period at exposed peak is 30 MPH or more.

THE RESPONSIBILITY FOR IMPLEMENTING THE VARIOUS PHASES OF THE SAFETY PLAN OUTLINED IN SECTIONS VI THROUGH XI.

## Section VII

### First Aid and Accident/Incident Reporting

#### A. Definition of Accident and Incident

1. As used in this Safety Plan, ACCIDENT shall mean:

- a. Destruction or substantial damage to the aircraft or service truck.
  - b. Damage to the aircraft components.
  - c. Minor, serious, or fatal injury to personnel.
2. As used in this Safety Plan, INCIDENT shall mean any air or ground mishap, malfunction, or situation involving aircraft or personnel which results in a deviation from standard procedures or has the potential or resulting in an accident, injury, or death.
- B. The contractor's personnel shall be equipped and trained to take proper action in an emergency. This is the contractor's responsibility.
  - C. The Forest Service COR or Inspector on the project will be equipped to take proper action in an emergency. Equipment will include a radio, an adequate first aid kit, Stokes litter, and crash rescue kit.
  - D. The person manning the base station or the radio net will have telephone numbers of doctors, ambulance service, and hospital service recorded in a convenient place for ready use. When a crash is reported, he will dispatch medical aid as soon as possible to the airport being used.
  - E. All injuries and/or accidents involving people will be reported immediately to the Base Station Operator on the radio net. The operator at the base station will immediately notify the Project Director, District Ranger, or his Acting who will notify the Forest Air Officer/Dispatcher.
  - F. Any accident or incident involving aircraft, regardless of severity, will be reported immediately to the Base Station Operator on the radio net. The Base Station Operator will immediately notify the District Ranger or his Acting. He will notify Forest Air Officer/Dispatcher who in turn will notify the Regional Air Officer. The Regional Air Officer will advise of further action and reporting requirements.

The initial verbal report will follow the format of Form 5700-14.

Additional accident reporting instructions are given in FSM 5714.18.

## Section VIII

### Search and Rescue before Crash is Located

- A. The Inspector on the project will notify Base Station Operator, and the Base Station Operator will notify the Project Director or District Ranger, who will notify the Forest Air Officer/Dispatcher of the general area of the search.

- B. The Forest Air Officer/Dispatcher will have the Forest Service plane or other alerted aircraft scout the area, keeping in radio communication with the base station.
- C. A radio-equipped ground rescue squad should be started toward the general crash area from the base station immediately, keeping in communication with search aircraft or base station for directions.
- D. The Base Station Operator will make arrangements for medical (doctor and hospital) and ambulance service.
- E. If crash is not located within a reasonable period, the Forest Air Officer/Dispatcher will request other qualified aerial observers to join the search.
- F. The Forest Air Officer/Dispatcher will notify the Regional Air Officer and notify the contractor's home office if it is a contract aircraft.
- G. The District Ranger, or his Acting, will notify the Sheriff of the county in which the emergency occurs.

## Section IX

### When Crash is Located

- A. Prior to the time the Sheriff takes over the administration of the rescue operation:
  - 1. The Base Station Operator will:
    - a. Immediately notify the District Ranger, or Acting, who will decide whether to use airborne or ground-rescue squads, and start whichever is decided upon.
    - b. Keep in constant communication with rescue squads and start medical and ambulance service to the crash.
  - 2. As soon as the rescue squad reaches the crash, they should report the condition of the pilot and any other persons involved in the crash to medical units and to the base station. The base station will relay the information to the Forest Air Officer/Dispatcher who will notify the Regional Air Officer.
  - 3. Whatever action is necessary to save the lives of the crash victim or victims will be taken by the medical unit and rescue squad. In case of fatality, the Forest Air Officer/Dispatcher will follow instructions in R-3 Supplement No. FSM 6179.15c.
  - 4. The Forest Air Officer/Dispatcher will initiate request for investigation and report by NTSB representative and Regional Air and Safety Officers.
- B. After the Sheriff takes over the administration of the rescue operation:

1. Forest Service personnel will assist the Sheriff as follows:
  - a. Furnish communications through the Forest Service communications system.
  - b. Furnish guide service to the scene of the emergency.
  - c. Help in arrangements for pack stock and other forms of transportation where necessary.
  - d. Furnish necessary maps, details of Forest organization, etc.
  - e. Aid in arrangements for ground personnel at the scene of the accident.
2. The Forest Air Officer/Dispatcher will keep the Regional Office informed of the developments in the rescue operation.

#### Section X

#### When the Contractor's Ground Crewman and/or Forest Service Representative Reach the Crash Site

- A. If the aircraft is on fire:
  1. Try to get the pilot out and move him to a safe area.
  2. Put out the fire with extinguisher unless it is dangerous to do so.
  3. If pilot is not seriously injured, arrange for delivery to hospital or doctor. If seriously injured or if extent of injuries is unknown, administer necessary first aid and request medical aid.
- B. If the aircraft is not on fire:
  1. If the pilot is not seriously injured take him to hospital or doctor.
  2. If the pilot is seriously injured or unconscious:
    - a. Do not move him from the aircraft.
    - b. Check to see if he is strangling or choking.
    - c. Check bleeding in accordance with the latest first aid procedures.
    - d. Treat for shock.
    - e. Obtain trained medical assistance.

## Section XI

### Where to Obtain Emergency Aid

Poison Control Center: Spokane, Washington  
509-747-1077 or 1-800-541-5624

Hospitals: Gritman Memorial  
Moscow, Idaho  
208-882-4511

Benewah Community  
St. Maries, Idaho  
208-245-5551

County Sheriff: Latah County  
Moscow, Idaho  
208-882-2216

Benewah County  
St. Maries, Idaho  
208-245-2555

Local Police Dept.: Moscow, Idaho  
208-882-5551

Ambulance: 208-882-2422

Fire Dept.: Moscow, Idaho  
208-882-2422

St. Maries, Idaho  
208-245-3344

Palouse Ranger District: Potlatch, Idaho  
208-875-1131

St. Maries Ranger District: 208-245-2531

National Response Center: 1-800-424-8802  
(Environment)





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